# ABSTRACTS . . . R. A. REINERS, Editor

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## • Oils and Fats

**Fate of selenium in the isomerization of oleic acid.** J. D. Fitzpatrick and M. Orchin(Applied Sci. Dept., Univ. Cincinnati, Cincinnati, O.). *J. Org. Chem.* 23, 918–19(1958). Three forms of the selenium catalyst are present during the isomerization of the oleic to elaidic acid at 200°: the original black, undissolved or bulk selenium; the active form of the selenium in solution, which on cooling, precipitates as the red modification; and the inactive species which remains in "solution" after cooling. Disappearance of the solid catalyst is rapid until a certain concentration level of the active form is obtained; solution by complexing occurs thereafter only as it is needed to maintain this concentration level against an inactivation reaction occurring concomitantly. The active species of the catalyst increases rapidly and then remains essentially constant during the reaction or until all the undissolved black form has disappeared. The concentration of the inactive form of selenium increases at a constant rate giving essentially a straight line.

**Essential fatty acid retention during certain oxidative flour and dough treatments and in breadbaking.** N. Fisher, M. L. Ritchie and J. B. M. Coppock(Baking Inds. Res. Sta., Chorleywood, Hertfordshire). *Chem. & Ind.* 24, 720–2(1958). Experimental evidence had been reported to show that oxidative flour treatment by chlorine dioxide does not destroy the essential fatty acids in flour. Further evidence is presented that essential fatty acids remain unaffected throughout the baking process; this is also true when oxidative treatment is effected by adding potassium bromate either to flour or to the dough-making ingredients (the resulting bread being the same).

**The coupled oxidation of β-carotene by a linoleate-lipoxidase system and by autoxidizing linoleate.** J. Friend(Low Temp. Sta. for Res. in Biochem. and Biophysics, Univ. of Cambridge and Dept. of Sci. and Ind. Res.). *Chem. & Ind.* 20, 597–8(1958). The coupled oxidation of β-carotene by a linoleate-lipoxidase system produces four ketones, and three of these are also found in the products of the coupled oxidation of β-carotene by autoxidizing linoleate systems catalyzed by the addition of ferrous phthalocyanine in aqueous emulsion. This latter oxidation also produces another three ketones, one of which resembles a fraction tentatively identified as retro-β-apo-9′-carotenone, isolated from the oxidation products of retro-dehydro-β-carotene. However, when the coupled autoxidation was carried out in benzene solution, the products contained seven conjugated polyene aldehydes and only one ketone. The spectroscopic properties of two of the aldehydes resemble those of β-apo-12′-carotenal and β-apo-10′-carotenal which can be prepared by controlled oxidation of β-carotene with hydrogen peroxide and osmium tetroxide, and it is possible that some of the other aldehydes are geometrical isomers of β-apo-carotenal.

**γ-Sitosterol from the leaves of Aegle marmelos Correa.** R. N. Chakravarti and B. Dasgupta(The School of Tropical Medicine, Calcutta). *J. India Chem. Soc.* 35, 194–6(1958). The sterol from the leaves of *Aegle marmelos Correa* (N.O. Rutaceae) has been identified as γ-sitosterol by preparation of the acetate and the benzoate.

**Unsaturated fatty acids. V. Preparation of α- and γ-linolenic-1-$C^{14}$ acids.** J. C. Nevenzel and D. R. Howton(Atomic Energy Project, School of Med., Univ. California, Los Angeles). *J. Org. Chem.* 23, 933–5(1958). The decarboxylation-reconstitution technique applied to the problem of labeling two trienoic acids, α-, or the common) linolenic (all-*cis*-9,12,15-octadecatrienoic) and γ-linolenic (all-*cis*-6,9,12-octadecatrienoic), with $C^{14}$ in the carboxyl group is described.

**For better doughnuts—select the frying fat that serves you best.** H. R. Vernon(Anderson, Clayton & Co., Dallas, Texas). *Baker's Digest* 32(3), 46–8(1958). The frying fats available on the market to-day; deodorized, stabilized lard, hydrogenated lard, liquid salad oil, blended vegetable shortening, blended meat fat and vegetable oil shortenings, hydrogenated meat fat and vegetable oil shortenings, hydrogenated all-purpose type shortenings, hydrogenated "longer life" vegetable oil shortenings were discussed. Fats with high initial smoke point and good stability of smoke point should be used for doughnut frying. To prolong the stability of fats, good equipment with temperature control should be selected. The fat used should have high turn over and filtered at the close of each day's operation.

**Hydrogenation of fatty acids with the help of hydrazine hydrate.** B. N. Tyutyunnikov and I. I. Novitskaya. *Masloboino-Zhirovaya Prom.* 24(2), 12–13(1958). The data indicate that the catalyst and not the hydrazine hydrate is responsible for the formation of isoöleic acid when sunflower and olive oils are hydrogenated in the presence of hydrazine hydrate. (*C. A.* 52, 10610)

**Procedure for the extraction of pure lanolin.** Isabella Harati, Rose Thea Schip, and Eugenia Leonte. *Rev. chim. (Bucharest)* 8, 703–9(1957). The lanolin is absorbed on a suspension of calcium sulfate. The absorbed lanolin is eluted with benzene, passed through aluminum oxide column to remove free fatty acids, soaps, and salts, and the solution is evaporated to recover a product having the characteristics: *n* 0.9444, $d^{15°}$ 1.4800–1.4814; freezing point 33-38°, melting point 36–38°, saponification number 94–98, acid number 0.2, ash 0.002%, color white-slightly yellow. (*C. A.* 52, 10610)

**Oxidative processes on refining of fats and oils.** Z. K. Lebedeva. *Masloboino-Zhirovata Prom.* 24(2), 13–15(1958). Refining of fats and oils under vacuum and in inert atmosphere is recommended to produce products of high nutritive quality. (*C. A.* 52, 10610)

**Continuous refining of fats with calcined soda.** M. S. Levit, V. I. Kirgetova, and E. A. Vol'vovskaya. *Masloboino-Zhirovaya Prom.* 24(2), 32–4(1958). The acid value and soap content of refined sunflower-seed oil were reduced to 0.2 and 0.06%, respectively, when the neutralization soda solution contained sodium carbonate in 25% excess of the theoretical amount needed. (*C. A.* 52, 10609)

**Sensitivity of cholesterol and isocholesterol to oxidation; paper-chromatographic detection of an oxidation product.** H. Janecke and G. Senft(Univ. Frankfurt a.M., Ger.). *Pharmazie* 12, 673–5(1957). The nonsaponifiable portion of wool fat (wool-fat alcohols) is an important factor affecting the sensitivity to oxidation. In paper-chromatographic tests with cholesterol and isocholesterol, oxidation products appeared which behaved like peroxide compounds. Free sterols could not be localized when unsaponified wool fat was subjected to paper chromatography; however, directly below the applied wool fat appeared a blue area which increased in color intensity with increasing peroxide number. Peroxide-free samples did not show this blue area unless heated for a long time at 100°. This method permits ready recognition of peroxide-free wool fats. Twelve references. (*C. A.* 52, 10609)

**Sterols of coconut oil.** B. Andersen and B. Krawack(Aarhus Olie Fabrik, A/S, Denmark). *Acta Chem. Scand.* 11, 997–1002 (1957)(in English). The distillation-pitch sterols and the extracted crude-oil sterols, respectively, from coconut oil contain: stigmastatrienol, 0 and 4.5; stigmasterol and fucosterol (combined) 31 and 31.5; α-spinasterol and sterol (combined) 3 and 6 with 0% sterol in pitch sterols; β-sitosterol, 66 and 58%. The data indicate that the sterol with conjugated double bonds (stigmastatrienol) and the one with the double bond at $C_7$ (sterol) are destroyed during distillation of the fatty acids. However, the ratio of the amount of β-sitosterol to the combined amounts of stigmasterol and fucosterol is not changed. (*C. A.* 52, 10611)

**Polymorphism of cocoa butter.** M. Ya. Antodol'skaya. *Zhur. Priklad. Khim.* 31, 237–9(1958). The cooling curve of cocoa butter heated to 100° and rapidly cooled to −80° showed a major endothermic effect at 18°, a small thermal effect at 3°, an exothermal effect at 7.5°, and a transition at 15°. These were aseribed to the vitrification and softening of the "fatty" glass of the metastable, vitrous γ-phase. Photomicrographs of specimens in the over-all melting range showed a homogeneous,

amorphous structure with numerous cracks. The thermograms of the γ-phase held 24 hours at 20–1° exhibited transition temperature, at 23.5° and 28°, of α- and β′-phases, and an over-all melting range between 20 and 31.6°. (*C. A.* **52**, 11304)

**Initial reactions in the autoöxidation of unsaturated fatty acids and esters.** N. A. Khan(Pakistan Council Sci. Ind. Research, Tejgaon, Dacca). *Oléagineux* **12**, 433–40(1957). (*C. A.* **52**, 10610)

**Experiments with the working of butter in vacuum.** Von Torsten Storgårds and O. Aule(Centrallab. Mjölkcentralen, Stockholm). *Intern. Dairy Congr., 14th, Rome*, **2**, Pt. 1, 448–54 (1956). Butter was worked without vacuum and with a pressure of 2, 3, and 4 m. of water. No great differences were found in these properties or in the keeping quality between butter worked in air or vacuum. (*C. A.* **52**, 10452)

**Modern technology of fat products. XXXII. The drying of raw materials.** H. P. Kaufmann and J. G. Thieme(Deut. Inst. Fettforsch., Münster, Ger.). *Fette, Seifen, Anstrichmittel* **58**, 1085–92(1956). A discussion of the various types of drying apparatus now used in large-scale operations, and the advantages and applications of each. (*C. A.* **52**, 10609)

**Modern technology of fats and fat products. XXXVIII. The cleaning and shelling of crude materials.** H. P. Kaufmann and J. G. Thieme(Inst. Fettforsch., Münster [Westf.], Ger.). *Fette, Seifen, Anstrichmittel* **59**, 456–64(1957). Equipment used in cleaning and husking crude materials is reviewed. (*C. A.* **52**, 11443)

**Thermal transformation of kitol in molecular distillation.** S. A. Burnasheva, I. E. Gekker, and V. I. Mukhina. *Rybnoe Khoz.* **34**(1), 67–74(1958). In the molecular distillation of whale oil all the vitamin A originally present is found in the distillate fractions collected at distillation temperature below 210°; however, redistillation of fraction collected at 210–50° yields more vitamin A (up to 51% more) owing to the kitols present being converted to vitamin A. Best yields are obtained by removing vitamin A and redistilling the fraction containing kitol. (*C. A.* **52**, 11444)

**Changes in the sesamol, sesmolin, and sesamin contents of sesame oil in the course of extraction and refining processes.** K. Fujimura and Y. Toyama(Nagoya Univ.). *Abura Kagaku* **7**, 31–2(1958). The sesamolin and sesamin in the oil decreased in the progressive steps of the refining, i.e. degumming, alkali deacidification, bleaching, and deodorization. The deodorized oil contained less than 0.002% sesamol and sesamolin and 0.270% sesamin. Sesamin was rather strongly adsorbed on the adsorbent used for bleaching, and the spent adsorbent might be advantageously utilized for recovering an oil fraction rich in sesamin through fractional extraction. (*C. A.* **52**, 11444)

**The oxidation of high paraffins to alcohols.** M. Klang and F. Esanu-Scheuerman. *Rev. chim. (Bucharest)* **7**, 462–7(1956). Solid paraffin (average molecular weight 363) was oxidized at 150–200° in the presence of 5–10% boric acid and small quantities of potassium permanganate. The oxidized product was extracted with methyl alcohol, and the fatty alcohols were isolated by esterification, saponification, and extraction with ether, benzene, or ethyl methyl ketone. (*C. A.* **52**, 10867)

**Production of hydroperoxide in methyl oleate by ozonized oxygen.** G. Izumi(Nagoya Kogyo Shikenjo). *Kôgyô Kagaku Zasshi* **59**, 1091–2(1956). Methyl oleate (10 g.) in 50 cc. glacial acetic acid was treated with a flow of ozonized oxygen, at a rate of 450 cc. per minute for 0.5–2 hours. The product, after distilling off the acetic acid, washing, and drying, was examined by the infrared spectrometer to give a strong peak at 2.9 microns, which indicates that hydroperoxide is produced by the treatment with ozonized oxygen, as in the cases of the similar sample exposed to ultraviolet rays. (*C. A.* **52**, 10874)

**Phosphatides.** V. I. Trusov. *Uspekhi Sovremennoi Biol.* **45**, 28–45(1958). A review covering lecithins, phosphatidylethanolamine, phosphatidylserine, acetalphosphatides (plasmalogen), inositol-containing lipides, sphingolipides, and the metabolism of phosphatides. (*C. A.* **52**, 11156)

**Vapor-phase chromatography of the methyl esters of fatty acids and their quantitative determination in fats by automatic electrometric titration.** A. Liberti, G. P. Cartoni, and U. Pallotta(Univ. Messina, Sicily). *Ann. chim. (Rome)* **48**, 40–9 (1958). An apparatus is described for vapor-phase chromatography which uses a thermostatically controlled, jacketed column (25–300°); the temperature is raised gradually during the process. The column is packed with glass powder with 8% by weight of silicone vacuum grease. The fats are hydrolyzed, the fatty acids isolated and converted by diazo-methane to methyl esters, and the methyl ester mixture is applied to the column in a stream of nitrogen. The vapor leaving the column is burnt to carbon dioxide and passed into $BaCl_2$–$Ba(OH)_2$–$H_2O_2$–ethyl alcohol solution, which is automatically kept at constant pH by a compensating current. The record of this current shows peaks corresponding quantitatively to the carbon dioxide formed. The method is tested on a synthetic mixture of acids ($C_2$ to $C_{22}$) and on natural palm, olive, and peanut oils, butter, vegetable margarine, and hydrogenated whale and cocoa oils. All the (saturated) acids can be clearly distinguished; the unsaturated $C_{18}$ acids are masked by stearic acid, but can be estimated by repeating the analysis after conversion of the unsaturated acids to (much less volatile) bromides. The sensitivity is 0.2 microequivalent, and the accuracy of the quantitative determination, 2–5%; the method is simple and quick. In disagreement with A. T. James and A. J. P. Martin, only $C_{16}$ and $C_{18}$ acids could be detected in olive oil. (*C. A.* **52**, 9868)

**Nutritional studies of milk fat.** Lillian S. Olsen and E. L. Jack(Coll. of Agr., Davis, Calif.). *Intern. Dairy Congr., 14th, Rome*, **2**, Pt. 1, 592–600(1956). Milk fat from Holstein-Friesian, Jersey, and Ayrshire cows on both summer and winter feed was fractionated by precipitation from pentane at −20° and −53°. These fats were fed to young male rats as 20% of their diet. Rats fed the −53° filtrate showed the greatest gain. The −20° precipitate was poorest. The original milk fat and the −53° precipitate were intermediate. The growth rates were not in the same order, but substantiate earlier reports of the superiority of the liquid fraction. Differences could not be attributed to breed or feed. The addition of 2% linolenic acid, the amount in milk, to the poorest fraction, −20° precipitate, did not improve growth. This substantiates the observation of other workers that there seems to be a growth factor in milk fat other than unsaturated fatty acids. (*C. A.* **52**, 10309)

**Protection of marine products from deterioration owing to the oxidation of oil. VII. Protection of aramaki (a mildly salted salmon) by 2,6-ditert-butyl-p-cresol (BHT).** K. Toyama, N. Yamaguchi, and K. Saruya(Tokyo Inst. Fisheries). *Nippon Suisangaku Kaishi* **22**, 383–5(1956–57). In contrast to other kinds of salted salmon, aramaki, a mildly and long-salted salmon, could be protected from bacterial deterioration most efficiently by BHT; butylated hydroxyanisole (BHA) and isoamyl gallate plus citric acid were not as effective. The effective doses were 0.0025–0.005% on fish, added in mixture with salt. BHA produced a yellowish color when used in excess. (*C. A.* **52**, 10454)

**The importance of the acid value for judging lard.** J. Wurziger and E. Lindemann. *Fleischwirtschaft* **10**, 152–61(1958). The acid value can be used to evaluate raw hog fat in predicting stability during storage. The iodine number can be used to determine freshness. Thus acid value of 1.5 is recommended as limit for lard with iodine number of 50 or lower, and acid value of 1.0 should be the limit with iodine number of 60 or higher. Nineteen references. (*C. A.* **52**, 10454)

**Effect of ionizing radiation on edible fats.** G. Egiazarov. *Masloboino-Zhirovaya Prom.* **24**(2), 18–20(1958). Effects of ionizing radiation on the biochemical and organoleptic properties of fats and oils are reviewed and discussed. Sixteen references. (*C. A.* **52**, 10454)

**Coriander flakes as a raw material for protein and fat.** F. Adamanis and F. Kaczmarek. *Przemst Spozywczy* **9**, 411–14 (1955). Fruits of coriander contain 1–1.4% essential oil and 26% fat. For best fat yields (13–15%) the seed should be ground and should contain 15–16% water. The oil cake contains 15.4% fat and 24.4% digestible protein, and is suitable for cattle feed. (*C. A.* **52**, 10454)

**Quality of edible hydrogenated fat obtained by continuous hydrogenation (process).** B. Ya. Sterlin. *Masloboino-Zhirovaya Prom.* **24**(2), 15–17(1958). A comparison is made between the samples of hydrogenated sunflower-seed oil manufactured by batch and continuous hydrogenation procedures and their solid and liquid fractions with regard to melting point, hardness, and iodine number. The iodine number of continuous hydrogenation procedure was found to be slightly higher than that of batch hydrogenation procedure. It was attributed to the higher starting temperature of continuous hydrogenation procedure. (*C. A.* **52**, 10454)

**Which vegetable oil is best for cheese?** N. Petersen. *Österr. Milchwirtsch.* **13**, 39–40(1958). In an attempt to make cheese crust softer, stronger, moister, and more elastic, cheeses were dipped in crude linseed, refined coconut, soybean, or palm-kernel oil, or a one to one ratio mixture of refined coconut and soybean oils. Only linseed oil gave satisfactory results, although a rancid flavor was sometimes imparted to the cheese with this oil. The cheese should be treated once or twice with a thin layer of linseed oil and, thereafter, wiped with concen-

trated brine to prevent a rancid or varnish-like flavor. (*C. A.* **52**, 10452)

**Detection of refined lard. 3. The ultraviolet-absorption spectrum.** H. P. Kaufmann, J. G. Thieme, and F. Volbert(Deut. Inst. Fettforschung, Münster, Ger.). *Fette, Seifen, Anstrichmittel* **58**, 1046–57(1956). The ultraviolet absorption of lard between 220 and 300 millimicrons was determined on samples of different origin to determine the effects of feeding, methods of rendering, refining, autoxidation, etc. Treatment of the lard with bleaching earth (i.e. fuller's earth) results in a curve with a distinct maximum at 268 millimicrons. This can be used to detect lards which have been refined in this way or which are mixtures of refined and unrefined lard. (*C. A.* **52**, 10452)

**Processes of structure formation in milk fat and their importance in the production of creamery butter.** A. I. Titov, I. N. Vlodavets, and P. A. Rebinder(All Union Sci. Research Inst. Milk Ind., Moscow). *Kolloid Zhir.* **20**, 93–101(1958). From the rate of penetration of a loaded ball into butter kept in a narrow tube, the plastic viscosity of the butter, independent of the ball diameter, can be calculated. The plastic viscosity at the rate of penetration = 0.01 cm./sec. at 12° had to be between 200,000 and 350,000 poises for the butter to have the consistency preferred in industry. Strong stirring of the butter lowered its plastic viscosity from e.g. 230,000 to 100,000, and rest after stirring raised plastic viscosity to 170,000 only; the crystal texture destroyed by agitation was only partly restored. The plastic viscosity of milk fat was greater the greater rate of cooling and also after agitation; thus, also the texture produced by coagulation and thixotropy was stronger when the cooling was more rapid. (*C. A.* **52**, 10451).

**Danish butters.** Kai Steen(Natl. Inst. Animal Husbandry, Copenhagen). *Intern. Dairy Congr., 14th, Rome*, 2, Pt. 1, 438–44(1956). From 1943 to 1954 the following indices of Danish butter were determined: Reichert-Meissl, Polenské, saponification, and iodine values. Some foreign countries have standards based on the ratio of Reichert-Meissl to Polenské values which would exclude an average of 60% of butters studied; adulteration cannot be based solely on the ratio. Saponification value frequently exceeds that which is termed normal. During recent years the iodine value of summer butter has been decreasing. These butters are at times too soft, which cannot be attributed to iodine value. Feeding high-roughage feeds may explain the changes. (*C. A.* **52**, 10451)

**A practical solution to the problem of flavor defects in cold-stored butter. I. The preparation of butter from frozen cream.** E. A. M. Meyknecht and B. van Dam(Dairy Board, Hague, Neth.). *Intern. Dairy Congr., 14th, Rome*, 2, Pt. 1, 577–80 (1956). To eliminate the low pH of butter serum in cultured butter during cold storage, summer cream was frozen and made into butter during the winter. Butter made from cream held in storage at the same temperature as butter made from the same cream before freezing was of considerably better quality than the butter held in storage. (*C. A.* **52**, 10451)

**Structure of butter.** H. E. Schulz. *Molkerei- u. Käserei-Ztg.* **9**, 160–1(1958). Butter consists of an aggregation of viscid, partially crystalline globules of fat interspersed with butter oil. (*C. A.* **52**, 10451)

**Composition of the "concretes" of red oil.** M. Loury and G. Lechartier (ITERG, Paris). *Rev. franç. corps gras* **5**, 202–4 (1958). Two samples of the concrete residues obtained industrially by the filtration of cooled liquid fatty acids of tallow hydrolyzed to the extent of 95–97% contained 9.40 and 11.20% of "neutral fat," which contained monoglycerides, 16 and 16%; diglycerides, 58 and 40%. These "concretes" are responsible for the rapid obstruction of the filter presses. They could be reduced by better splitting. (*C. A.* **52**, 11443)

**Fish oil from Arctoscopus japonicus.** K. Matsumoto and T. Honjo(Ibaragi Univ., Hitachi). *Kôgyô Kagaku Zasshi* **59**, 1087(1956). General properties of oil obtained from *Arctoscopus japonicus* and of the solid and liquid acid fractions from the oil are given. (*C. A.* **52**, 10613)

**Tomato-seed oil.** V. D. Gioshvili and L. A. Tsulukidze. *Masloboino-Zhirovaya Prom.* **24**(2), 6–7(1958). Some of the physical-chemical properties of natural and hydrogenated Georgian-grown tomato-seed oil are reported. (*C. A.* **52**, 10613)

**Vegetable oil as an absorbent for ligroine vapors.** F. A. Vishnepol'skaya. *Masloboino-Zhirovaya Prom.* **24**(2), 30–2(1958). As an absorbent for recovery of ligroine vapor in an oil-extraction plant, sunflower-seed oil absorbs an average of 7.3% ligroine on the weight of the oil, if the ligroine-air mixture is passed through the fractionating column at the rate of 0.7 meter per second. Sunflower-seed oil used for absorption of ligroine accumulates a considerable quantity of oxy compounds, so that it cannot be used for manufacture of edible fats. (*C. A.* **52**, 10613)

**Column chromatography of soybean phosphatides.** G. De Zotti and G. Jacini(Staz. sper. olii grassi, Milan). *Olii minerali, grassi e saponi, colori e vernici* **34**, 533–5(1957). Alcohol-soluble soybean phosphatide fractions were chromatographed to isolate lecithins with high choline content. Adsorption was from a 1% solution in absolute alcohol on silicic acid in a sector column, with methylcellosolve as eluent. For the determination of phosphorus, a modified Burton and Riley method is described; the sample (about 0.002 g.) is ashed with sulfuric acid and hydrogen peroxide, treated with ammonium molybdate, reduced to molybdenum blue, and determined chromatographically. (*C. A.* **52**, 10613)

**Production of sterols from by-products of rapeseed-oil refining.** H. Niewiadomski(Tech. Hochschule, Gdansk, Poland). *Olii minerali, grassi e saponi, colori e vernici* **34**, 420–2(1957). The crude oil is hydrated with water, steam, or salt solution, then neutralized. The soapstock obtained contains the sterols, which are saponified and salted, and the soaps are extracted with acetone. About 50% of the sterols contained in the oil can be recovered. (*C. A.* **52**, 10612)

**Progressive hydrolysis of peanut oil by castor-bean lipase.** H. Nizamuddin and B. S. Kulkarni(Osmania Univ., Hyderabad). *J. Sci. Ind. Research (India)* **16***C*, 217–18(1957). Degree of hydrolysis of peanut oil by castor-bean lipase increased from 4.17% after 10 minutes to 24.47% after 2.5 hours. Differences in the iodine values and in the saponification values of unhydrolyzed portion at various stages of hydrolysis show that the various saturated and unsaturated acid radicals are not split off in proportion to their concentrations, and that there is preferential splitting among the mixed glycerides. Iodine numbers of the liberated acids increase progressively during the course of the hydrolysis. The proportion of monoglycerides produced was below 3.5%. (*C. A.* **52**, 10612)

**Fluorometry of olive oils. II.** A. Arpino, G. Ricca, and G. Jacini(Staz. sper. ind. Olii grassi, Milan). *Olii minerali, grassi e saponi, colori e vernici* **34**, 475–9(1957). The influence of some secondary compounds (peroxides, free fatty acids, chlorophyll, and carotenes) on the fluorescence of the oil was examined. Decolorization to eliminate chlorophyll and peroxides increases the fluorescence of pressure olive oils. This increases also with the degree of unsaturation of the fatty acids present in the oil and decreases with increasing content of active oxygen. (*C. A.* **52**, 10612)

**The evaluation of the refractometric degree of rectified olive oils.** T. N. Plebani and G. Bigoni(Gaslini S. A., Genoa). *Olii minerali, grassi e saponi, colori e vernici* **34**, 451–2(1957). Low indexes of refraction in the rectified "B" olive oils are not to be considered as proof of genuineness. In doubtful cases the authors suggest determination of iodine number, melting point of the fatty acids, the amount of unsaponifiable matter, and determination of cholesterol in the latter. (*C. A.* **52**, 10612)

**The determination of sediments in raw linseed oils.** P. J. De Coninck and J. Delacourt. *Olii minerali, grassi e saponi, colori e vernici* **34**, 409–19(1957). A new method is described which avoids some inconveniences of the British specifications. (*C. A.* **52**, 10612)

**Potentiometric method for determination of acid value of dark-colored oils.** A. L. Markman and A. I. Gan. *Masloboino-Zhirovaya Prom.* **24**(2), 3–5(1958). Electrometric titration of dark-colored cottonseed oil provides an accurate method for determination of acid value. Five g. of oil dissolved in 5 ml. of ethyl ether and diluted with 5 ml. of 10% alcohol solution of lithium chloride is titrated with 0.05 *N* solution of potassium hydroxide by using a 1 *N* calomel half cell as a standard reference electrode. (*C. A.* **52**, 10611)

**Effect of solvent on the kinetics of hydrogenation of cottonseed oil.** D. V. Sokol'skii, L. S. Melekhina, and L. I. Perunova. *Zhur. Priklad. Khim.* **30**, 1799–1806(1957). The effect of the solvent on the rate of hydrogenation of cottonseed oil over Raney nickel was studied. For each solvent there is an optimum temperature at which hydrogenation is at a maximum. The values of optimum temperature for cottonseed oil in different solvents were: benzene, 30°; toluene, 60°; xylene, 90°; ethylbenzene, 80°; dioxane, 70°; dichloroethane, 30°; ethyl alcohol, 60°; acetone, 40°. Correlation of optimum temperature with the vapor pressures of the solvents showed that for all values of optimum temperature of the benzene homologous series the vapor pressure was about 170 mm. Hg. At higher temperatures and vapor pressures, hydrogen was diluted and the process became diffusional. Thus solvents can be chosen

to dilute hydrogen and increase the selectivity of hydrogenation. (*C. A.* **52**, 10611)

**Diffraction spectra of solid fats.** B. V. Ozimov, N. K. Val'kova, and M. T. Golovkina(Technol. Inst. Refrigeration Ind., Leningrad). *Masloboino-Zhirovaya Prom.* **24**(2), 10–12(1958). Diffraction spectra of lard, beef tallow, bone oil, milk fat, butter, margarine, and of butter after 3–9 days of storage at 16–18° are discussed with regard to their use in determination of blending ratio, quality of fat, changes in color during storage, etc. (*C. A.* **52**, 11306)

**Ripening sunflower seeds.** M. Jáky and N. Homonnayńe(Forschungsinst. Pflandzliche Öle Budapest). *Fette Seifen, Anstrichmittel* **59**, 419–20(1957). Analyses for moisture, husk, kernels, raw protein, oil, alcohol extract, phosphatide, sugar, and starch were made on sunflower seeds during various periods of maturation. The constants of the oil were also determined in each case. (*C. A.* **52**, 11444)

**A new test for detecting the presence of refined seed oils in natural olive oil.** E. Synodinos and Z. Koustas. *Chim. Chronika* (Athens, Greece) **23**, 21-6(1958). Shake ten ml. of the earth-decolorized sample with ten ml. nitric acid (specific gravity 1.40) in a stoppered cylinder for thirty seconds and observe the color of the upper layer after two to five minutes. A light yellow color indicates natural olive oil whereas other colors indicate the presence of seed oil in the mixture. (*C. A.* **52**, 11444)

**Determination of heptachlor residues in olive oil.** Maria E. Alessandrini and G. F. Lanforti. *Rend. ist super. sanità* **20**, 816–22(1957). An analytical method which gives good results with 50–250 γ of heptachlor per 20 grams of oil is described. (*C. A.* **52**, 11444)

**Procedures for preventing the increase in acid number of rice-bran oil during storage of rice bran.** K. Tsujino and K. Kitaichi. *Yushi Kagaku Kyôkaishi* **2**, 139–43(1953). Heating rice bran at 120° for five to ten minutes inhibits development of the free fatty acids in the oil present during storage. (*C. A.* **52**, 11444)

**Characteristics of the seed oil of pistacia vera.** G. Condorelli (Univ. Catania, Sicily). *Boll. inform. ind. olearia e saponiera* **3**, 136-40(1957). The seed oil of *Pistacia vera*, as manufactured by pressure, had the following properties: $d^{15}$ 0.919, $n^{25}$ 1.4688, iodine number 95, saponification number 191, acid number 0.95, peroxide number 0, unsaponifiable matter (petroleum ether extraction) 0.46, (ethyl ether extraction) 0.89, sterols 0.214, total hydrocarbons 9.94, squalene 0.025%, β-carotene 765, xanthophyll 250, chlorophyll a and b 0, tocopherols, 10,100, and phosphatides 0 γ %. The ultraviolet absorption spectrum of the whole oil and of the alcohol solution of its unsaponifiable fraction showed two peculiar peaks at 274 and 280 millimicrons and the presence of 0.5% linolenic acid. (*C. A.* **52**, 11445)

**Comparison of fractional and amplified distillation.** H. Sturm, R. Aeschbacher, and A. Demmler(Soap factory Steinfels, Zurich Switz.). *Rev. franç. corps gras* **5**, 134–9(1958). The methyl and butyl esters of the mixed fatty acids of coconut oil are distilled in an argon atmosphere at 10- to 3-mm. pressure with a still having a 1-meter column filled with Raschig rings. The results are compared with distillation of methyl ester by entrainment with petroleum ether (boiling at 50–220°) at 10-mm. pressure (amplified distillation). On the basis of saponification number of the individual fractions, best separation was with the latter system. (*C. A.* **52**, 11445)

**Acetone for the extraction and refining of [vegetable] oils.** B. Foresti(Univ. Catania, Sicily) and A. Giuffrida. *Boll. inform. ind. olearia e saponiera* **3**, 129–35(1957). A review with twenty-one references. (*C. A.* **52**, 11445)

**Oils from cuttlefish (Ommastrephes sloani pacificus) and mackerel (Scomber japonicus).** M. Yamada(Hokkaidô Univ., Hakidate), Hideko Takai, M. Mizuta, and Y. Toyama. *Yushi Kagaku Kyôkaishi* **2**, 149–52(1953). The range (and average in parentheses) of characteristics of 26 samples of cuttlefish liver oil was $d_4^{20}$ 0.9230–0.9289 (0.9261), $n_D^{20}$ 1.4800–1.4838), (1.4824), acid number 5.2–22.8 (12.4), saponification number 179.1–187.7 (184.8), iodine number 178.8–206.5 (189.1), unsaponifiable matter content 2.45–6.94 (4.03) %, ether-insoluble bromides of fatty acids 64.71–79.27 (73.93) %, saturated acids 25–7%, trisaturated glycerides 1–2%, and vitamin A 0.418–0.585 in terms of $E^{1\%}_{1\ cm.}$ 325 millimicrons. The above values for mackerel oil (16 samples) were, respectively, 0.9178–0.9246 (0.9213), 1.4764–1.4794 (1.4778), 0.31–26.8 (8.79), 187.0–196.6 (191.8), 139.7–166.1 (152.3), 0.41–3.02 (1.23)%, 39.84–58.11 (47.92)%, 22–5, 1–3, 0.144–0.328.

**Ether-extracted oils from cuttlefish liver of low oil content and the residue of cuttlefish oil rendering.** Y. Toyama, H. Takai (Nagoya Univ.), and M. Yamada. *Ibid.* 152–4. The oil prepared by ether extraction (acetone-soluble oil) from cuttlefish liver poor in oil contained far more unsaponifiable matter (9.64–48.30%) and a little more ether-insoluble bromides of fatty acids (72.74–85.67%) than did the cuttlefish oil reported above. The oil prepared by ether extraction (acetone-soluble oil) from rendered residue had more unsaponifiable matter than did the rendered cuttlefish oil. (*C. A.* **52**, 11446)

**Emulsification of milk fat by ultrasonic waves.** G. Tverdokhleb (Agr. Acad., Riga, Latvia). *Molochnaya Prom.* **19**(3), 30–2 (1958). Stable emulsions of milk fat (up to 25%) in whole milk, skim milk, sweet and cultured buttermilks can be produced, even in the absence of added emulsifying agent, by exposures to ultrasonic waves (intensity 8 watts per square centimeter, frequency 380 kilohertz) for 15–30 minutes. Addition of emulsifying agents in the following order: rennet casein 0.35, lecithin 1.0, or egg yolk 4.0% considerably intensified the emulsification process. (*C. A.* **52**, 11304)

**Properties of oils neutralized by ion-exchange resins.** A. O. Gómez and A. S. Cartaya(Inst. Alonso Barba, Sevilla). *Anales real soc. espaň. fís. y quím. (Madrid)* **53B**, 781–4(1957). Fatty oils neutralized by ion-exchange resins retain more of their natural antioxidants and pigments than the oils neutralized by alkalies. Spectrophotometric analysis and oxidation studies were used in the evaluation. (*C. A.* **52**, 10611)

**The use of a mixture of trichloroethylene and heptane for the extraction of oil-bearing materials.** G. Cinquina. *Olii minerali, grassi e saponi, colori e vernici* **34**, 447–50(1957). In order to eliminate some inconveniences of the ordinary solvents, a mixture of trichloroethylene and heptane, in some cases even octane, was used. The trichloroethylene and heptane are miscible in any proportion and do not show azeotropic points, so that at the boiling point the composition of the vapor is different from that of the initial liquid mixture. The mixture contains an excess of trichloroethylene, and shows the properties of trichloroethylene in dissolving oils, waxes, etc. from the cakes, while during the concentration of the solution in the still, the concentration of heptane increases because it is less volatile. By use of this solvent it is possible to extract vitamins, carotenoids, etc., from the oils. (*C. A.* **52**, 10611)

**Continuous solvent-oil extraction.** K. P. Velloso. *Anais congr. estad. quím. technol., 2°, Pelotas,* **1955**, No. 2, 29–40. A mathematical treatment is presented of the efficiency of continuous oil extraction by solvent, as a function of number of stages, oil and solvent amounts, contact time, and extractor size (*C. A.* **52**, 10611)

**Researches on the soluble volatile acids of olive oil.** A. Corrao (Univ. Palermo, Sicily). *Olii minerali, grassi e saponi, colori e vernici* **34**, 536–8(1957). In the fraction distillation by Reichert-Meissl-Wollny technique (modified) from fresh olive oils the following acids were identified by paper chromatography: formic, acetic, propionic, butyric, valeric, capronic, and caprylic. It is interesting to note the presence of acids having odd number of carbon atoms, not usual in fats of vegetable origin. (*C. A.* **52**, 10611)

**Clear polymers for floor waxes.** A. A. Kroner. *Soap Chem. Specialties* **34**(5), 125, 127, 129(1958). Kroner discusses synthetic waxes and resins, e.g., acrylic, vinyl, and styrene polymers, available for compounding transparent floor products. (*C. A.* **52**, 11446)

**Report on decomposition in cream and butter: chromatographic method for simultaneous determination of volatile acids and WIA.** H. C. Van Dame(Food & Drug Admin., Dept. Health, Ed. & Welfare, Kansas City 6, Mo.). *J. Assoc. Official Agr. Chemists* **41**, 247–8(1958). Further studies on the combined determination of WIA and butyric acid in cream and butter are reported.

**Report on antioxidants in oils, fats, and waxes.** H. W. Conroy (Food & Drug Admin., Dept. Health, Ed. & Welfare, Kansas City 6, Mo.). *J. Assoc. Official Agr. Chemists* **41**, 258–9(1958). Results are reported on the determination of antioxidants in a vegetable oil shortening, oleomargarine, and lard. The present A.O.A.C. method for propyl gallate was found to give a satisfactory recovery in the presence of BHT and BHA, but not in the presence of NDGA.

**Report on dairy products.** W. Horwitz(Div. of Food, Food & Drug Admin., Dept. of Health, Ed. & Welfare, Washington 25, D. C.). *J. Assoc. Official Agr. Chemists* **41**, 260–2(1958). Recommendations are made concerning the proposed methods for foreign fats in dairy products, cryoscopy of milk, preservation of milk samples, and fat in ice cream.

**Report on foreign fats in dairy products: sterol acetate test.** J. H. Cannon(Food & Drug Admin., Dept. Health, Ed. & Wel-

fare, St. Louis 1, Mo.). *J. Assoc. Official Agr. Chemists* **41**, 268–71 (1958). The method is described in detail. As the result of a collaborative study it is concluded that the chances of failing to detect the presence of 10% vegetable oil in butterfat are small.

**The determination of oil content and crude fat by the use of anhydrous ether, Skellysolve B and Skellysolve F.** D. A. Shearer and R. B. Carson (Chem. Div., Canada Dept. Agr., Ottawa). *J. Assoc. Official Agr. Chemists* **41**, 414–16 (1958). Fat contents were determined in a number of oil seeds, dried forages, dried silages, cereals and cereal products. Except with flaxseed, rapeseed and wheat flour, significantly less crude fat was extracted by Skellysolve F (4 hr.) than by Skellysolve B (16 hr.) or anhydrous ethyl ether (4 hr.). The latter extracted significantly more than Skellysolve F from forages and silage, but less from wheat by-products. Skellysolve B and ethyl ether did not differ significantly with oil seeds and cereals. Because ethyl ether extracts more pigments from dried forages and more lactic acid from silages, the petroleum ethers probably give a more valid estimate of the true fat content.

**Identification of oils and the detection of oil adulteration by differential infrared spectroscopy.** J. G. Bartlet and J. H. Mahon, Food & Drug Directorate, Dept. or National Health and Welfare, Ottawa, Ontario, Canada). *J. Assoc. Official Agr. Chemists* **41**, 450–9 (1958). A differential infrared spectroscopy technique is described for the identification of oils and the detection of adulteration. Oil samples are dissolved in carbon tetrachloride. The effects of cell length, concentration, and slit width are shown. Spectra are reported for rapeseed oil, olive oil, mixtures of these two oils. In addition, differential spectra against olive oil are shown for oils from nasturtium seed, mustard seed, safflower, soybean, corn, cottonseed, coconut, palm, sunflower, sesame, tea seed, peanut, butter, tallow, lard, menhaden, herring and seal, and hydrogenated soybean, palm, seal and cottonseed oils. The effect of unsaturation on the spectra at 1130 and 1112 $cm.^{-1}$ is shown graphically. Of the oil tested, only tea seed oil showed a spectrum which was similar to olive oil and would not be detected by this method. Since each oil tested has a characteristic spectrum, the differential infrared spectrum technique will be useful for the rapid identification of many unknown oil samples. Oils that are very similar to each other, such as soybean, corn and cottonseed oils, have a differential spectra with respect to olive oil that are very similar. However, if one of these is used for reference, differences between these oils become apparent. The assignment of spectral bands to specific groupings in the molecules is discussed in detail.

**Extraction of sterols.** H. J. Muehler (Anheuser-Busch, Inc.). *U. S. 2,837,540.* Fungoid organisms are partially hydrolyzed with an aqueous solution of an alkali. The insoluble residue is treated with an alcoholic solution of alkali to saponify the lipids and extract the sterols. The extract is mixed with sufficient water to precipitate the sterols which are finally separted.

**Method for continuous processing of tall oil.** F. E. Sullivan (The De Laval Separator Co.). *U. S. 2,838,481.* Tall oil skimmings are treated with aqueous acid in such a way that an exothermic reaction occurs producing a mixture of tall oil, spent acid water, lignin, salts and reaction gases. The mixture is degassed. Tall oil is recovered by centrifugation.

**Refining of fatty oils.** A. U. Ayres and F. H. Smith (The Sharples Corp.). *U. S. 2,838,553.* A process is described for the refining of oils by treatment with aqueous sodium carbonate solution.

**Cream tablet.** H. S. Brochner (Ordex Lab. ved ingenir C. O. Rasmussen). *U. S. 2,839,407.* A method is described for the preparation of a compressed cream tablet having a high degree of solubility in warm drinks. The tablet is made from milk, butter fat, carbohydrates and proteins in the proportions of 30 to 60% butter fat, 6 to 12% protein and at least 20% carbohydrates.

**Phosphorylated phosphatides.** D. J. Hennessy and R. J. Mosby (American Lecithin Co., Inc.). *U. S. 2,839,545.* A process is described for the preparation of a phosphorylated, peroxidized phosphatide having less than 50% of the original number of double bonds and an increased solubility in aqueous systems and water. The phosphatide is first treated with an organic peracid, such as peracetic, perpropionic, or perlactic acid. The peroxidized phosphatide is then reacted with phosphorus pentoxide. The reaction occurs without substantial destruction or charring.

**Treatment of bleached phosphatides with metal salts.** P. F. Davis (The Glidden Co.). *U. S. 2,839,546.* To a mildly alkaline peroxide-treated phosphatide is added an aqueous solution of a manganous, cobalt, nickel or iron salt. The mixture is heated at a temperature between 100° and 200°F. until the peroxide value has been reduced.

**Process for the manufacture of condensation products of monounsaturated fatty acids or esters.** G. L. Wiggerink and E. W. Jonker (N. V. Koninklijke Stearine Kaarsenfabrieken "Gouda-Apollo"). *U. S. 2,839,550.* A fatty material is condensed with a dienophilic compound, such as maleic acid or anhydride, or methacrylic acid, in the presence of a catalyst such as iodine, HI, ICl, $ICl_3$, IBr, IF, iodoform, hydriodic acid salts of organic bases or $ZnI_2$. The fatty material is selected from the group consisting of monounsaturated higher fatty acids or esters, or mixtures thereof with saturated fatty acids or esters.

**Process for the separation of saturated and unsaturated fatty acids or their volatile esters with the simultaneous preparation of condensation products of the unsaturated fatty acids.** G. L. Wiggerink and E. W. Jonker (N. V. Koninklijke Stearine Kaarsenfabrieken "Gouda-Apollo"). *U. S. 2,839,551.* Mixtures of the type described in U. S. 2,839,550 are heated at 120° to 300° until the unsaturated fatty materials have completely reacted with the maleic anhydride, and the nonreacted fatty material is separated from the adducts.

**Stabilization of organic compounds.** J. A. Chenicek (Universal Oil Products Co.). *U. S. 2,843,495.* Lard or gasoline may be stabilized against deterioration in storage by the addition of both a 2,4,6-trialkyl phenol and a 5-hydroxycoumaran.

**Separation of sterols from deodorizer sludges.** W. Brown and H. W. Rawlings (Eastman Kodak Co.). *U. S. 2,843,610.* Deodorizer sludge is saponified with methanolic alkali. The mixture is acidified and the sterol-containing phase is separated. This is dissolved by heating in a mixture of 9 to 100% by vol. of methanol, 0 to 90% of acetone or methyl ethyl ketone, and 0 to 10% of water. The solution is cooled and sterols which crystallize out are removed.

**Sugar-cane-wax esters and diamides for polishes.** H. H. Hatt and J. A. Lamberton (Commonwealth Scientific and Industrial Research Organization). *Australian 163,052.* Diamides or polyhydric alcohol esters of acid-bleached sugar cane wax, when compounded with paraffin wax and turpentine (or white spirits), give paste polishes of high gel strength and flow point. The esters are prepared by heating the wax and alcohol with a catalyst at 110–30° under reduced pressure. Di- (and higher) ethylene diamides are prepared by condensation of the carboxyl groups with the diamines at up to 200–15°. To prepare the methylenediamide, the wax is refluxed with sulfurous oxychloride, treated with ammonium hydroxide, and condensed with formaldehyde in alkaline alcohol solution to form $CONHCH_2OH$ groups, and then treated with dilute aqueous acid. (*C. A.* **52**, 10615)

**Stabilization of glycerides.** Coopérative des producteurs et exportateurs d'huile de palme du Congo-Belge "Congopalm" Société Coopérative de droit Congolais. *Belg. 510,395.* The alteration of glycerides which is indicated by an increase in the free-fatty-acid content caused by spontaneous hydrolysis is inhibited by addition of products containing at least one hydroxyl group and (or) at least one epoxy group, such as methyl alcohol, ethyl alcohol, glycerol, epichlorohydrin, ethylene glycol, ethylene oxide, or glycidol. The amounts required vary from 0.1 to 3% depending on the water content. The reaction is accelerated by heating at 50–100°. (*C. A.* **52**, 10615)

**9,11-Linoleic acid.** J. Scheiber. *Ger. 833,644.* A simple preparation of 9,11-linoleic acid from ricinoleic acid is obtained by carrying out the water cleavage in the presence of enough 9,11-linoleic acid to first convert most of the ricinoleic acid into the ester. The temperature is held at such a point that there is quick ester formation, followed by quick decomposition. Equal parts of technical 9,11-linoleic acid and ricinoleic acid were heated with stirring to 200°. The acid number fell from 190 to 110–120 and temperature was raised to 250–280° per 20–30 mm. Water distilled and the process was stopped when the acid number reached about 180. The yield was almost quantitative and the product could be used without further purification for alkyd resin production. (*C. A.* **52**, 10151)

**Mixed esters of carbohydrates.** R. Schnegg (Farbenfabriken Bayer A.-G.). *Ger. 859,445.* Colorless esters are obtained by esterifying carbohydrates with such mixed anhydrides of fatty acids, which are purified and decolorized with active carbon. Thus, an anhydride mixture is prepared by treating propionic acid with ketene and agitating with carbon. (*C. A.* **52**, 10166)

**Continuous manufacturing of cacao butter-like product.** T. Takatsuki. *Japan. 7429('57).* In the preparation of a cocoa fat-like product by crystallization of 20–50% of coconut oil, palm-kernel oil, or palm oil in an organic solvent, such as acetone or ethyl methyl ketone, the wash liquor from the second filter is partly used for washing crystals in the first filter and

partly for mixing with the raw material to reduce the amount of fresh solvent required. (*C. A.* **52**, 10459)

### FATTY ACID DERIVATIVES

**Reaction of fatty amines with ethylene oxide.** S. Komori, S. Sakakibara, and A. Fujiwara(Osaka Univ.). *Technol. Repts. Osaka Univ.* **6**, 387–91(1956). Polyoxyethylene alkylamines were prepared by the condensation of lauryl- and stearylamine with ethylene oxide without catalyst or with alkaline catalysts such as sodium, sodium hydroxide, potassium hydroxide, sodium carbonate, or potassium carbonate. The condensation rate increased with temperature between 110–230°, optimum temperature 150–190°. Noncatalytic condensation yielded mainly the dihydroxyethyl tertiary amines, N,N-*bis*,2-hydroxyethyl)lauryl- and stearylamine. Condensation products of laurylamine containing 1 and 3 moles of ethylene oxide were also prepared. With strong alkaline catalysts, the induction time was lowered but the distribution of products was more scattered than with weak ones. (*C. A.* **52**, 10876)

**3-Hexyl- and 3-octyladipic acids.** D. W. Goheen and W. R. Vaughan(Chemistry Lab., Univ. Michigan, Ann Arbor, Mich.). *J. Org. Chem.* **23**, 891(1958). The preparations of 3-hexyl and 3-octyladipic acids are reported.

**Composition of polyoxyethylene (8) stearate.** R. L. Birkmeier and J. D. Brandner(Atlas Powder Co., Wilmington, Del.). *J. Agr. Food Chem.* **6**, 471–5(1958). The composition of polyoxyethylene(8)stearate was investigated to determine its safety as a food additive. This compound—made by reacting 7.4 moles of ethylene oxide per mole of commercial stearic acid—contains unesterified polyoxyethylene glycol and polyoxyethylene glycol monostearate, distearate in the molar proportions of 1.1 to 2.0 to 1.0, with free esterified polyethylene glycols having equal polymer lengths. After allowance for small amounts of catalyst and water, the results are those expected if rapid ester interchange occurs. The polyglycols through the nonamer comprise 81% of the total polyglycols and the polymer distribution approximates a Poisson distribution.

**Separation of mixed fatty acids.** D. Swern and W. E. Parker (Secy. Agr., U.S.A.). *U. S. 2,838,480.* Monounsaturated fatty acids are separated from mixtures of saturated, mono- and polyunsaturated fatty acids by a process in which saturated acids are first removed by crystallization from an aqueous methanol solution of the acids at about 0°. The mother liquor is treated with urea so as to cause crystallization of urea complexes of the monounsaturated and residual saturated fatty acids. The complexes are removed and decomposed with hot water. Monounsaturated acids are finally purified by fractional distillation.

**Salts of sulfated amine glycosides.** J. G. Erickson(General Mills, Inc.). *U. S. 2,838,487.* Preparation is described of an alkali metal salt of a sulfated fatty amine N-glycoside in which the fatty amine group contains 8 to 22 carbon atoms.

**End wrap impregnated with a fatty acid ester of a polyhydric alcohol.** J. H. Sanders(The Proctor & Gamble Co.). *U. S. 2,839,066.* An end wrap for aligning and conditioning hair during a waving process is prepared by impregnating a porous fabric with lanolin, a perfume, and partial ester of a polyhydric alcohol and a $C_{12}$ to $C_{18}$ fatty acid, for example, sorbitan monolaurate.

**Wax coatings containing synergistic antioxidants.** B. N. Stuckey and W. N. Gearhart(Eastman Kodak Co.). *U. S. 2,843,497.* A stable aqueous emulsion for the coating of flexible sheet packaging materials is prepared from about 40 parts by weight of water and about 60 parts of a solution containing (a) about 20 parts by vol. of di-isobutyl adipate, (b) 25 parts of glyceryl monostearate, and (c) about 10 parts of a synergistic antioxidant consisting of 1 to 6 parts by wt. of *tert.*-butyl-*p*-hydroxyanisole and 1 to 4 parts of 3,5-di-*tert.*-butyl-*p*-hydroxytoluene.

**Process for the preparation of fatty amides.** L. G. Ricciardi and J. P. Di Geronimo(Colgate-Palmolive Co.). *U. S. 2,843,-612.* A fatty acid monoglyceride is prepared by the alcoholysis of a triglyceride with a lower monohydric alcohol in the presence of an alkali metal alkoxide. The crude reaction product is reacted with a hydroxy alkyl amine selected from the group consisting of hydroxy mono- and diamines containing up to 4 atoms in each alkyl radical. The final product is a fatty acid hydroxy alkyl amide.

**Wax emulsions.** K. Behringer (Badische Anilin- & Soda-Fabrik Akt.-Ges.). *Ger. 908,733.* Linear polyesters obtained by reaction of bivalent alcohols with dicarboxylic acids or carbonic acid show poor miscibility with normal waxes and form unstable aqueous mixed emulsions. An emulsifier is prepared by alkaline saponification of the reaction product of waxlike carboxylic acids and condensation products of multivalent alcohols and high-molecular fatty acids in which most of the hydroxyl groups are esterified. When this emulsifier is mixed with linear polyesters, the composition becomes compatible with normal wax, e.g. ceresin, paraffin, or beeswax, and gives stable emulsions when mixed with water. (*C. A.* **52**, 10616)

## • Biology and Nutrition

**Mechanism of cholesterol absorption. II. Changes in free and esterified cholesterol pools of mucosa after feeding cholesterol-4-$C^{14}$.** L. Swell, E. C. Trout, Jr., J. R. Hopper, H. Field, Jr., and C. R. Treadwell(Veterans Administration Center, Martinsburg, West Virginia). *J. Biol. Chem.* **233**, 49–53(1958). Evidence is provided that a metabolic pool of free cholesterol exists in the intestinal mucosa. The existence and turnover of this pool has made it possible to explain certain aspects of cholesterol absorption and also to postulate a mechanism of absorption.

**The uptake of lipoproteins by ascites tumor cells. The fatty acid-albumin complex.** Dorothy L. Fillerup, J. C. Migliore, and J. F. Mead(Atomic Energy Project, School of Med., Univ. of California, Los Angeles). *J. Biol. Chem.* **233**, 98–100(1958). The absorption of palmitic acid-1-$C^{14}$ by ascites tumor cells was studied *in vitro*. Palmitate was metabolized more rapidly from its albumin complex than from buffer alone, but the albumin carrier was not absorbed or metabolized. Cyanide inhibited cells absorbed palmitate from the medium but did not metabolize it. The process of absorption was thus revealed as a distribution of fatty acid between the medium and the inert cell surface, probably followed by an active transfer of the fatty acid into the cell for oxidation.

**A study of the role of palmityl coenzyme A in fatty acid synthesis by the pigeon liver system.** J. W. Porter and R. W. Long(Radioisotope Unit, Veterans' Administration Hosp., and Dept. of Physiol. Chemistry, Univ. of Wisconsin, Madison, Wis.). *J. Biol. Chem.* **233**, 20–5(1958). It is suggested from the present work, and a number of other experimental studies, that synthesis of fatty acids may proceed via coenzyme A esters. However, it is also pointed out that such a conclusion still requires reservations.

**The turnover of squalene in relation to the biosynthesis of cholesterol.** A. V. Loud and Nancy L. R. Bucher(Huntington Memorial Hosp. of Harvard Univ., at the Massachusetts General Hosp., Boston, Mass.). *J. Biol. Chem.* **233**, 37–41(1958). Turnover rates in hepatic squalene in rat liver indicate a metabolic separation of this compound into relatively active and inert components. The active compound has been demonstrated to become labeled prior to cholesterol, to possess a rate of turnover sufficiently rapid to function as a direct precursor of cholesterol, and to constitute no more than a small fraction of the total hepatic squalene.

**Red cell lipides.** J. C. Turner(Columbia Univ.). *A.M.A. Arch. Internal Med.* **101**, 310–11(1958). A review of the dynamics of red-cell metabolism as related to the architecture of the cell and to changes of the cell related to disease and to aging. (*C. A.* **52**, 11134)

**The effect of dietary oils and fatty acids on cholesterol metabolism in the rat.** J. D. Wood and B. B. Migicovsky(Can. Dept. Agr., Ottawa). *Can. J. Biochem. and Physiol.* **36**, 433–8(1958). Rats were fed diets containing 20% oils and 9% fatty acids, and the effect on cholesterol metabolism was studied. Unsaturated oils and fatty acids increased total cholesterol in the liver and stimulated the incorporation of $C^{14}$-acetate into cholesterol both *in vivo* and in liver homogenates. Saturated material such as coconut oil and lauric acid had the opposite effect, except that it had no significant effect on synthesis in homogenates. The effect of oils in the diet was rapid, the stimulating effect of rapeseed oils being observed after the rats had been placed on the diet for as short a period as 3 days. (*C. A.* **52**, 10317)

**Effect of the nature of dietary fat on synthesis of cholesterol from acetate-1-$C^{14}$ in rat-liver slices.** S. Mukherjee and R. B. Alfin-Slater(Univ. of S. California, Los Angeles). *Arch. Biochem. Biophys.* **73**, 359–65(1958). The incorporation of acetate-1-$C^{14}$ into cholesterol in liver slices was studied in rats maintained on 4 experimental diets for 1, 4, and 16 weeks. Maximum cholesterol was synthesized in the liver of rats receiving a diet containing 15% cottonseed oil. Cholesterol synthesis was markedly reduced in animals receiving a fat-defi-

cient diet and in those on a diet containing 30% hydrogenated coconut oil. Addition of linoleic acid to the animals on a fat-free diet maintained a normal cholesterol level and normal cholesterol synthesis. The depression of cholesterol synthesis in the livers of animals fed the fat-deficient diet may result from the accumulation of cholesterol in the liver which occurs in these rats. (*C. A.* **52**, 10317)

**Examination by chylomicrography of the variations in absorption of plant and animal fats in infants.** J. Jochims(Städt. Krankenhaus, Süd, Lübeck, Ger.). *Klin. Wochschr.* **35**, 593 (1957). Human infants were given 0.5–1.0 g. butter fat or vegetable oil and the post-ingestion increase in capillary chylomicrons was determined. The lipemia was greater following vegetable oil ingestion. A possible relation between this observation and the higher degree of unsaturation of the vegetable oil was indicated. (*C. A.* **52**, 10314)

**Influencing arteriosclerosis with fat-soluble vitamins.** G. Weitzel(Justus Liebig Inst., Giessen, Ger.). *Bull. schweiz. Akad. med. Wiss.* **13**, 356–62(1957). Four-year-old hens were fed diets enriched with vitamins $K_1$, E, or A. Hens of this age have spontaneous atherosclerosis, so the effect of the vitamins on an existing condition could be studied. Vitamin $K_1$ had no effect on the total fat, free and esterified cholesterol, or phosphatide level after treatment for 75–100 days. Vitamin E alone had little, if any, effect. Vitamin A produced macroscopic and chemical regression of atherosclerotic symptoms. When vitamins A and E were combined, the fat plaques and the cholesterol content of the aorta both diminished. Serum lipide determination did not reflect the lipide changes found in the aorta. (*C. A.* **52**, 10312)

***Effect of a diet rich in fat, unsaturated fatty acids, phospholipides and vitamin B on the blood cholesterol levels.*** T. F. Bloem, E. van Handel, and H. Neumann(Hosp. St. Antoniushove, Voorburg, Neth.). *Bull. schweiz. Akad. med. Weiss.* **13**, 348–55(1957) (in English). A specially prepared high-fat diet was given to 48 patients, of whom 18 had failed to respond to a low-fat diet, 4 were normal, and 26 had not been treated by diet. Twenty-six patients showed a drop in blood cholesterol, 17 patients with normal concentrations of cholesterol showed no change, and one continued to show a high concentration of cholesterol. Serum lipide phosphorus levels reflected the change in cholesterol in most cases, so that the cholesterol:phospholipide ratio did not increase. The diet contained 50 g. soybean flour, 50 g. peanuts, 50 g. peas or beans, and 3 g. lecithin. Butter or margarine were restricted to 25 g. daily. Lard and other animal fats, shortening, white bread and other flour and cereals were not allowed. Meat, milk, eggs, cheese, whole wheat bread, and unpolished rice were not restricted. Liquid soybean oil was used as a cooking fat. (*C. A.* **52**, 10312)

**The effect of dietary protein, fat, and choline upon the serum lipides and lipoproteins of the rat.** R. E. Olson, J. R. Jablonski and E. Taylor(Univ. of Pittsburgh, Pittsburgh, Pa.). *Am. J. Clin. Nutrition* **6**, 111–18(1958). Rats developed a marked hypocholesterolemia, hypolipemia, and hypobetalipoproteinemia when fed soy protein diets low in methionine and choline. These effects were prevented by the addition of 0.3% choline to the diet and were partially prevented by casein. The level and type of dietary fat (ranging from 6 to 42% and including butterfat, corn oil, and lard) did not modify this effect of choline upon serum lipides. (*C. A.* **52**, 10305)

**Vitamin $B_6$ in internal medicine.** L. Wayne, J. J. Will, B. I. Friedman, L. S. Becker, and R. W. Vilter(Univ. of Cincinnati, Cincinnati, O.). *A.M.A. Arch. Internal Med.* **101**, 103–55(1958). The chemical and biological activities of vitamin $B_6$ suggest that it may have an important bearing on arteriosclerosis. Human beings in whom a vitamin-$B_6$ deficiency state was induced by 4-deoxypyridoxine formed antibodies to A and B blood group substances and to typhoid vaccine as efficiently as well-nourished persons. (*C. A.* **52**, 10306)

**The action of certain animal and vegetable fats on the serum lipide concentration.** H. Malmros and G. Wigand(Univ. Lund, Swed.). *Bull. schweiz. Akad. med. Wiss.* **13**, 315–29(1957) (in German). To investigate the possible role of fats of differing origin, 24 adults, 18–61 years old, were studied on a controlled diet. Cholesterol concentration in serum fell within a week when vegetable fats were used to the exclusion of animal fats. When milk fat was fed, cholesterol concentration rose to previous levels. In 5 cases of hypercholesteremia, vegetable fat diets caused a marked depression in cholesterol concentration. Possible causes for the effect are discussed. (*C. A.* **52**, 10312)

**Atherosclerosis and cholesterol metabolism with special reference to the question of diet.** G. Schettler(City Hosp., Bad Cannstatt-Stuttgart, Ger.). *Bull. schweiz. Akd. med. Wiss.* **13**, 301–14(1957) (in German). The cholesterol concentration in plasma drops when the caloric intake is strictly limited. Eight subjects, observed over a thirteen-year period, showed significant lowering of cholesterol concentration during the years 1946–8 as compared to the years 1943 and 1954. In 1946–8, their diets consisted principally of starchy foods, with a caloric value of 1000–1200 calories. Linoleic acid-rich diets lower the concentration of cholesterol and lipide phosphorus. The effects of a single fat-rich meal, containing butter, various oils, triolein, mono-, di-, and triglycerides of $C_{8-12}$ fatty acids are inconclusive. Normal subjects and patients with coronary infarcts were used in the latter study. (*C. A.* **52**, 10366)

**Lipoproteins in atherosclerosis: a comparison of the results of paper electrophoresis with those of ultracentrifugal analysis in a high-density medium.** A. Fasoli, F. Salteri, and A. Cesana (Univ. Milan). *Bull. schweiz. Akad. med. Wiss.* **13**, 200-8(1957) (in English). Comparisons were made of various methods of analysis for lipoproteins. Analysis of ultracentrifugation for high-density lipoproteins ($S_{1.21}$ 0–15) and paper-electrophoretic analysis of the fractions migrating with albumin, $\alpha_1$-globulin, and the "F" fraction, when present, showed a relatively good correlation. Very poor correlation was found between the $S_{1.21}$ 70–400 lipoproteins found by ultracentrifugation, and the $\beta_2$-lipoproteins found by electrophoresis. This can be explained by the rather nonspecific adsorption phenomenon which give rise to the $B_2$ component. Findings indicated that changes in high- and low-density lipoproteins are associated with clinical signs of atherosclerosis. Changes in the high-density class were observed in many unrelated conditions. The most reliable information to be obtained by paper electrophoresis seems to be the $\beta/\alpha$ ratio. (*C. A.* **52**, 10365)

**Role of lipoproteins in coronary disease.** F. T. Lindgren and H. W. Gofman(Univ. of California, Berkeley). *Bull. schweiz. Akad. med. Wiss.* **13**, 152–78(1957) (in English). The transport phase of lipide metabolism involves almost entirely the blood lipides in the form of serum lipoproteins. High levels of low-density serum lipoproteins, $S_f^\circ$ 0–12 and $S_f^\circ$12–400, are associated with the development and presence of human arteriosclerosis. Two methods for determining the $\alpha$ function, also called the atherogenic index, which measures the rate of development of arterioscleroses are described. Follow-up studies over a six-year period show that clinical consequences of arteriosclerosis can be predicted by the level of lipoprotein. Diet, thyroid substances, and heparin can be used to alter the serum lipoprotein level. The use of methods described for the measurement of the $\alpha$ function may be useful as screening procedures for prevention of premature arteriosclerosis. (*C. A.* **52**, 10365)

**Vegetable oils and serum cholesterol. Short-term experiments with rapeseed and sunflower seed oils.** E. Linko(Univ. Turku, Finland). *Acta Med. Scand.* **159**, 475–88(1957). When rapeseed oil was added to a standard diet which included 50 grams of butter as the only fat, there was an appreciable decrease in the blood cholesterol level in seven of fifteen patients. The decreases were slight or temporary in the other patients. The individual response did not depend upon the initial cholesterol level. After the rapeseed oil feeding was terminated the cholesterol values rose. The cholesterol-depressing effect of sunflower seed oil in seven patients was not uniform. A fat-free diet had a greater depressing effect on cholesterol level in five of ten patients. In general the $\beta$-lipoprotein levels tended to follow those of the cholesterol. (*C. A.* **52**, 11200)

**Essential fatty acids, lipide metabolism, and atherosclerosis.** L. W. Kinsell, G. D. Michaels, R. W. Friskey, S. Splitter, G. Fukayama, H. P. Chin, Marjorie Coelho, Sadie Smyrl, Florence Olson and Y. Fisher(Highland Alameda County Hosp., Oakland, Calif.). *Lancet* **1**, 334–9(1958). In both healthy and unhealthy people, addition of ethyl and glycerol esters of linoleic acid to the diet lowered the plasma lipide levels. Oleic acid preparations had no effect. Probably linoleic acid is the major active ingredient in vegetable fats that lowers plasma cholesterol. Administration of a phosphatide mixture from liver, containing 12.5% tetraenoic acid, profoundly lowered plasma cholesterol, which suggests that arachidonic acid may be more potent than linoleic acid. Diets rich in essential fatty acids were more potent in lowering plasma cholesterol than were low-fat, high-carbohydrate diets. (*C. A.* **52**, 11201)

**Nutritive value of high-acidity ghee.** S. Tawde and N. G. Magar(Inst. Sci., Bombay). *Ann. Biochem. Exptl. Med.* (Calcutta) **17**, 177–8(1957). Albino rats were fed for four weeks on diets of fat 25, casein 10, cane sugar 60, salt mixture 5%, and vitamins. No differences were observed in weight gain, blood fatty acid composition, or liver and muscle fat and phospholipide content, when fats (ghee) of different fatty acid content were used. (*C. A.* **52**, 11202)

**Hypertension and arteriosclerosis in rats produced by a high fat and protein diet.** Jean Trémolières, M. Brunaud, T. Melik, and Vilma Segal. *Compt. rend.* **246**, 1284–6(1958). Arteriosclerosis was produced in three to twelve months in rats by feeding a diet of: perirenal fat 30, horse meat 18, devitamized casein 18, whole wheat flour 20, cholesterol 2, Osborne salt mixture 2 grams, and vitamin A 20 I. U. (*C. A.* **52**, 11203)

**Absorption and metabolism of dihydrocholesterol and β-sitosterol.** R. G. Gould, L. V. Lotz, and E. M. Lilly. *Biochem. Problems Lipids, Proc. Intern. Conf. 2nd, Ghent,* **1955**, 353–8 (Pub. 1956). In rats fed for 5 days a diet containing 1% dihydrocholesterol there was a greater discrepancy in the content of dihydrocholesterol and cholesterol than rats on a normal diet. Of the plasma cholesterol 25–35% was replaced by dihydrocholesterol, 20–30% of liver cholesterol, and about 15% of carcass cholesterol. Feeding β-sitosterol to both rats and humans under a number of conditions showed appreciable absorption, but always much less than for cholesterol under the same conditions. In contrast to dihydrocholesterol, sitosterol appeared not to accumulate in the liver esterified fraction. (*C. A.* **52**, 11205)

**Unsaturated fatty acid composition of subcutaneous fat and liver fat in rats in relation to dietary fat.** H. Dam and P. F. Engel(Polytech. Inst., Copenhagen). *Acta Physiol. Scand.* **42**, 28–35(1958). When newly weaned female rats were given, through a period of 183 days, a fat-free basal diet supplemented with varying amounts of peanut oil, the percentage of dienoic acid in the subcutaneous fat declined sharply with time during the first 40 days, and then leveled off at values nearly proportional to the daily dose of peanut oil. The amount of dienoic acid in the liver was not influenced by the peanut oil supplement, trienoic acid declined with increasing amounts of peanut oil, and tetraenoic acid increased with increasing amounts of peanut oil. The sum of trienoic acid and tetraenoic acid was not influenced by the amount of peanut oil fed; this phenomenon is discussed in relation to the origin of the trienoic acid of fat-deficiency. (*C. A.* **52**, 11204)

**Digestion of a synthetic triglyceride with medium-chain fat acids ($C_8$, $C_{10}$, $C_{12}$) in humans.** G. Rindi(Univ. Pavia, Italy) and V. Perri. *Quaderni nutriz.* **16**, 46–50(1956) (Pub. 1957). By experimental technique of Deuel *et al.*, the digestion coefficient of a pure triglyceride of the caprylic, capric, and lauric acids in a number of humans averaged 96.7. (*C. A.* **52**, 11206)

**Report on color in eggs.** R. H. Forsythe(Henningsen, Inc., P. O. Box 2327, National Station, Springfield, Mo.). *J. Assoc. Official Agr. Chemists* **41**, 274–6(1958). Results are reported of a collaborative study of the method for estimating color in egg yolk solids, using β-carotene as the standard.

**The growing importance of the crude fiber determination in oilseed meals.** R. T. Doughtie, Jr.(Smalley Comm., Am. Oil Chemists' Soc., P. O. Box 8145, Memphis 4, Tenn.). *J. Assoc. Official Agr. Chemists* **41**, 4416(1958). This paper presents the findings of a study of collaborative results by various analysts on 11 samples of the 1956–7 check series of oilseed meals distributed by the Smalley Committee of the A.O.C.S., and makes certain suggestions and and recommendations for further intensive study of the method. The need for a more accurate method of determining crude fiber is discussed.

**Effects of dietary proteins, methionine and vitamins on plasma lipids and atherogenesis in cholesterol-fed cockerels.** J. Stamler, Ruth Pick, and L. N. Katz(Cardiovascular Department, Medical Research Inst., Michael Reese Hospital, Chicago, Ill.). *Circulation Research* **6**, 442(1958). Methionine deficiency in the presence of a high-fat, high-cholesterol diet aggravates atherogenesis in the cockerel. High-protein, high-vitamin supplementation suppresses the atherogenic effect of a cholesterol-fat-containing diet. High-protein supplementation alone had a suppressive effect; high vitamin supplementation had no effect. However the combined protein and vitamin supplement was the most effective.

**Effects of dietary protein and carbohydrate level on cholesterolemia and atherogenesis in cockerels on a high-fat, high-cholesterol mash.** J. Stamler, Ruth Pick, and L. N. Katz (Cardiovascular Dept., Medical Research Inst., Michael Reese Hospital, Chicago, Ill.). *Circulation Research* **6**, 447(1958). Decreased protein intake in the presence of a high-fat, high cholesterol diet was found to produce marked aggravation of hypercholesterolemia and atherogenesis in cockerels. Sucrose was substituted for protein in this low protein diet. The effect of this diet is not due to sucrose since restoring the protein to a high level, while keeping the sucrose in the ration constant, had no such effect.

**Determination of choline in egg products, flour, and noodles.** H. Salwin, Mary Devine, and J. H. Mitchell, Jr.(Quartermaster Food and Container Institute for the Armed Forces, 1819 West Pershing Rd., Chicago, Ill.). *J. Agr. and Food Chem.*, **6**, 475–9(1958). A colorimetric method is presented for determining choline in noodles as a measure of egg yolk content. The method measures the total choline of the phospholipides whether or not they have been altered by hydrolysis. Results are therefore independent of the manufacturing conditions and storage history of the samples. Typical analyses of dry whole eggs, commercial egg yolk solids, durum semolinas, and semolina-farina blends are reported.

**Effect of nicotinic acid on the incorporation of radiocarbon into cholesterol.** J. M. Merrill(Veterans Adm. Hosp., Nashville, Tenn.). *Circulation Research* **6**, 482(1958). Nicotinic acid when fed to rats as 0.8 per cent of their diet caused an 83 per cent increase in radioactivity of liver cholesterol-digitonin precipitate. *In vitro* studies using rat liver slices indicated that nicotinic acid increased the incorporation of radiocarbon into cholesterol by 46 per cent.

**Fatty acid composition of component lipides from human plasma and atheromas.** F. E. Luddy, R. A. Barford, and R. W. Riemenschneider(Eastern Regional Research Laboratory, Philadelphia, Pa.) and J. D. Evans. *J. Bio. Chem.* **232**, 843(1958). Elution chromatography on silicic acid columns has been employed for the separation of tissue lipides into their component sterol esters, glycerides, free sterol-fatty acids, and phospholipides. A study was also made of the application of the spectrophotometric method for analysis of fatty acid composition of the lipide fractions. These procedures were successfully applied to the separation and analysis of lipides from human plasma and atheromas. The polyunsaturated acid content of the lipides from plasma was much greater than that for the corresponding lipides from atheromas, whereas the oleic acid content was much greater in the atheroma lipides. The saturated acid content of the cholesterol esters and glycerides from atheromas was considerably less than in corresponding fractions from plasma.

**Observation on lipid utilization in hens fed vegetable and animal fat supplemented diets.** G. A. Leveille and H. Fisher (Dept. of Poultry Sci., Rutgers Univ., New Brunswick, N. J.). *Poultry Sci.* **37**, 658(1958). Single Comb White Leghorn hens were fed rations containing no fat or 10% levels of corn oil and tallow, each at levels of 15 and 25 per cent protein from twelve weeks of age.

**The enzymatic esterification of vitamin** A. N. I. Krinsky(Biological Laboratories, Harvard University, Cambridge, Massachusetts). *J. Bio. Chem.* **232**, 881(1958). A cell-free enzyme preparation capable of esterifying vitamin A alcohol has been obtained from various eye tissues. The enzyme is concentrated in the pigment epithelium, where it is found in a particulate fraction. The pH optimum for the reaction is at 8.2, and the activity is greatly enhanced by the addition of sulfhydryl compounds. The product of the reaction is a long chain fatty acid ester of vitamin A. Of the eye tissues studied, only the retina is capable of hydrolyzing long chain fatty acid esters of vitamin A.

**Effects of the energy to protein ratio on serum and carcass cholesterol levels in chicks.** M. Kokatnur, N. T. Rand, and F. A. Kummerow(Department of Food Technology, University of Illinois, Urbana, Ill.). *Circulation Research* **6**, 424(1958). "Soft" fats were found to depress significantly serum cholesterol levels in diets of high energy to protein (E/P) ratio but not in diets of low energy to protein ratios. A low (E/P) ratio depressed serum cholesterol values, regardless of the type of fat in the diet. The E/P ratio may represent the unknown factor in the equations of workers who have tried to relate the effect of dietary fats to serum cholesterol levels.

**Deposition in tissues and fecal excretion of trans fatty acids in the rat.** Patricia V. Johnston, O. C. Johnson, and F. A. Kummerow(Dept. of Food Tech., Univ. of Illinois, Urbana). *J. Nutrition* **65**, 13(1958). *Trans* fatty acids in the form of hydrogenated margarine stock were fed to rats. *Trans* fatty acids were found to be deposited in the tissues only when they were present in the diet. The largest amount of the deposited *trans* fatty acids were found in the carcass fat, smaller amounts in the liver, and only small quantities were excreted in the feces; the major portion of the ingested *trans* fatty acids were metabolized. When the *trans* fatty acids were removed from the diet they gradually decreased in amount in the tissues. The presence of *trans* fatty acids in the diet did not appear to inhibit growth.

**Possible Involvement of Lipids in Protein Synthesis.** R. W. Hendler(Lab. of Cellular Physiology and Metabolism, National Heart Institute, Bethesda, Maryland). *Science* **128**, 143–4 (1958). Several theoretical aspects would make the consideration of a lipid participation in protein syntheses seem worth while. The microsomal membranes present an extensive ori-

ented lipide surface within the cytoplasm. Since it would appear that amino acids may occur in a lipid-soluble complex, it would seem that an efficient means of rapid amino acid accumulation at sites of synthesis may be accomplished by the structure. Furthermore, the energy considerations in the condensation of two amino acids to form a peptide bond with the concomitant splitting out of water would favor a medium of low water concentration.

**Bioassay of vitamin E by the dialuric acid hemolysis method.** L. Friedman, W. Weiss, Frances Wherry, and O. L. Kline (Div. of Nutrition, Food and Drug Administration, Dept. of Health, Ed., and Welfare, Washington 25, D. C.). *J. Nutrition* 65, 143(1958). A bioassay procedure that utilizes the protective effect of a single dose of vitamin E in rats against the *in vitro* hemolytic action of dialuric acid upon vitamin E-deficient erythrocytes has been described, and its precision, specificity, and dependability studied. The method will allow easy application to a variety of products that contain vitamin E. Biological potencies determined by this method are reported for several tocopherols and their esters. The results differ from earlier reports in the literature in that the values reported here for *d*-gamma tocopherol and its acetate are higher and that there is no significant difference between the ester and alcohol forms of the various tocopherols. The *d*-alpha-tocopherol, in accordance with earlier work, is about 33% more potent than the racemic form.

**Dietary fat and blood clotting in chicks.** R. Davis, B. March, and J. Biely(Dept. of Poultry Sci., The Univ. of British Columbia, Vancouver, B. C.). *Poultry Sci.* 37, 648(1958). Vitamin K deficiency was induced in chicks by feeding diets composed of natural ingredients but without green feed or supplementary vitamin K. On the basis of prothrombin time of blood of chicks fed the diets, the vitamin K deficiency could be prevented, or alleviated in instances where the deficiency was severe, by inclusion of 8 per cent beef tallow, hydrogenated animal fat, cottonseed oil or hydrogenated cottonseed oil in the diets.

**On the restoration of fatty acid biosynthesis after fasting.** G. N. Catravas and H. S. Anker(Department of Biochemistry, University of Chicago, Chicago, Ill.). *J. Bio. Chem.* 232, 669 (1958). A factor was found to be present in the liver of normal rats and pigs and in yeast which when added to a liver homogenate from fasted rats, increased the rate of incorporation of acetate carbon into fatty acids. Up to a 30-fold increase was obtained with material from yeast which had been purified approximately 400-fold and appeared to act in catalytic amounts. The substance lost its activity if treated with 1 *N* hydrochloric acid, was stable in 0.1 *N* formic acid, and was partly destroyed above pH 9. Although it did not seem to contain free acidic or basic groups, it was soluble only in water. The concentration of this material in the liver seemed to depend upon the nutritional state of the animal and to control the rate of fatty acid synthesis in this organ.

**New ethanolamine-containing lipide from egg yolk.** H. E. Carter, D. B. Smith, and D. N. Jones(Division of Biochemistry, Noyes Laboratory of Chemistry, University of Illinois, Urbana, Ill.). *J. Bio. Chem.* 232, 681(1958). Alkaline hydrolysis of egg yolk phosphatides gives a crude sphingolipide fraction containing a ninhydrin-positive substance (ethanolamine-lipide). The purified ethanolamine-lipide contains no sphingosine and has been shown to consist mainly of a phosphoryl-ethanolamine derivative of batyl alcohol. The presence of similar glycerol ether phosphatides in other lipides is indicated by analytical data. Studies of the distribution of ether phosphatides are now in progress.

**Microbiological production of Beta-carotene in shaken flasks.** R. F. Rnderson, Margie Arnold, G. E. N. Nelson, and A. Ceigler (Northern Utilization Research and Development Division, Agricultural Research Service, U. S. Department of Agriculture, Peoria, Ill.). *J. Agr. Food Chem.* 6, 543 (1958). When appropriate plus and minus strains of various members of the *Choanephoraceae* were grown together in a grain based medium in shaken flakes, carotene production was increased four- to fivefold over that obtained with unmated strains. Production of carotene by mated cultures was further enhanced by the addition to the medium of vegetable oils, detergent, and β-ionone. Chromatographic analysis showed that 75% of the pigments produced was all-*trans* β-carotene.

# • Drying Oils and Paints

**Some recent advances in the chemistry and technology of drying oils.** G. H. Hutchinson(John M. Hamilton & Co. Ltd., Wincolmlee, Hull). *J. Oil Colour Chem. Assoc.* 41, 474–92 (1958). A review with thirty-eight references.

**Oxidation and film formation of drying oils.** H. P. Kaufmann (Deut. Inst. Fettforsch., Münster i.W., Ger.). *Fette, Seifen, Anstrichmittel* 59, 153–62(1957). A detailed discussion is given of the factors that are important for the oxidative changes of unsaturated fatty acids and glycerides, including the processes involved in normal autoöxidation and film formation, both with and without additives. The role of accelerators is considered. 55 references. (*C. A.* 52, 11438)

**Preparation of film-forming substances based on nondrying and semidrying oils.** A. A. Ivanova. *Zhur. Priklad. Khim.* 31, 279–89(1958). The content of linoleic esters in the products of dehydration of castor oil was higher with zinc than with gumbrin catalysts. The superiority of sodium acid sulfate as a dehydrating catalyst was confirmed. That the reaction was dehydration rather than polymerization was shown by the decrease in viscosity of the products. The presence of more than 50% of unimolecular acid (ricinoleic acid → linoleic acid) supported the postulate that the process was intramolecular dehydration. (*C. A.* 52, 11438).

**Transformation of marine oils into drying oils.** J. Weiss. *Offic. Dig., Federation Paint & Varnish Production Clubs* 29, 995–1017(1957). The method is applied to fish and other marine oils for the production of drying oils suitable for the protective coating industry. Properties of the resulting oils are described. Varnish cooking schedules are given. (*C. A.* 52, 11438)

**Transformations of semi-drying oils.** C. Boelhouwer, D. M. Garcia, J. J. de Ruiter and H. I. Waterman(Lab. Chem. Engr., The Technological Univ., Delft, Holland). *J. Applied Chem.* 8, 387–90(1958). Samples of soybean, herring and menhaden oils were subjected to elaidinization in the presence of sulfur dioxide or interesterification catalyzed by sodium methoxide under various reaction conditions. Products were separated by fractional crystallization from *n*-pentane. Only menhaden oil showed a reasonable increase in the unsaturation of the liquid fraction as a result of elaidinization or interesterification. In the case of herring oil, a satisfactory separation into a liquid and a solid fraction was obtained only by crystallization at −15°. Elaidinization and subsequent directed interesterification brought about crystallization of a much larger amount of solid triglycerides than did either process separately. The iodine values of the solid fractions show that considerable amounts of unsaturated fatty acid glycerides, apparently in the higher-melting elaido-form, are involved in the crystallization process.

**Drying and the influence of driers.** L. H. Allan(British Resin Products Ltd.). *Paint Technol.* 22, 161–8 (1958). The nature, function, use and limitations of driers are reviewed, with particular emphasis on alkyd systems.

**Mildew resistant paint composition.** R. F. Heran, Sr.(The Pioneer Manufacturing Co.). *U. S. 2,837,433.* A mildew resistant paint is prepared from a drying oil base and pigment including ferriferrocyanide and copper naphthenate.

**Styrenated oils.** J. Nichols(Ethicon, Inc.). *U. S. 2,837,546.* A bodied, styrenated oil is prepared from glycerides of 12-keto-oleic acid and 12-keto-10-octadecenoic acid.

**Polymerization of unsaturated triglycerides.** C. J. Ish(Pennsalt Chemicals Corp.). *U. S. 2,837,547.* Solid rubberlike polymeric products obtained by the action of anhydrous hydrogen fluoride on unsaturated triglycerides are dissolved in hydrogen fluoride. The resulting solution is flooded with water. Thereby, relatively soft and waxlike materials may be separated from the original polymer.

**Polymerized fatty oils.** M. Kantor and S. G. Wilson(Cargill, Inc.). *U. S. 2,838,551.* An unsaturated fatty oil is polymerized by blowing with oxygen at 70° to 300°F., mixing the blown oil with 0.2 to 0.5% sulfuric acid and continuing the heating at 70° to 160°F., and finally neutralizing the acid with alkali.

**Bodied resinous polyamides.** G. G. Wilson(General Mills, Inc.). *U. S. 2,839,549.* A polyamide of a polymeric fatty acid and a polyalkylene polyamine is prepared to contain from 1.3 to 3.0 amino groups per carboxyl group and to have an acid number below 10. This polyamide is bodied by heating at 200° to 300° for 6 to 30 hr.